PATENT ABSTRACTS OF JAPAN

(11)Publication number :   07-068892

(43)Date of publication of application : 14.03.1995

(51)Int.Cl.	B41J 21/00 G06F 3/12 G06K 7/10

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(54) PRINTING DEVICE

(57)Abstract:

PURPOSE: To automatically perform all the works ranging from the inputting of data to the outputting of totalized result on form paper in print by simple operation without using host apparatus.

CONSTITUTION: A printing device, within which a printing part and a controlling part are equipped, is equipped with slots 2-1 and 2-2, an operation displaying part 3, a mark sheet reader 4, a paper cassette insertion port 5 and the like so as to put the predetermined print on paper in order to deliver printed paper with delivery rollers 6 to a delivery tray part 7. For example, a software card, in which the software for the scorecard of a golf, is installed in the slot 2-1 so as to let the mark sheet reader 4 to read the marks in the scorecard of every player and perform simple inputting operation through the operation displaying part 3 in order to automatically totalize scores, calculate the gross and net of every player, decide ranking and output in print in the predetermined scorecard form of golf competition. Duplicatingly printing on fixed form paper may well be performed by the number of the entrants of the golf competition. Further, the outputting in print on a large-sized paper for site placarding can also be carried out by connecting with a plotter.
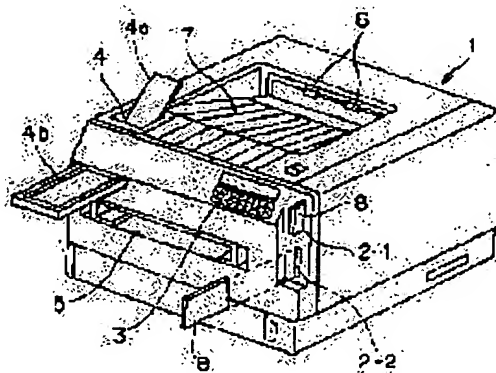
LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

(54)【発明の名称】　　内燃機関のＯＨＣ型動弁装置

1

【特許請求の範囲】
【請求項１】機関本体（Ｅ）のシリンダヘッド（２）に、吸，排気カム（18,17）を有する動弁カム軸（16）、および該カム軸（16）の両側に対をなす吸，排気用ロッカアーム軸（19,20）を設け、それらロッカアーム軸（19,20）に吸，排気用ロッカアーム（21,22）をそれぞれ揺動自在に支承し、前記吸，排気用ロッカアーム（21,22）の一端を前記吸，排気カム（18,17）にそれぞれ連接し、またそれらの他端を吸，排気弁（10,11）に連接してなる、内燃機関のＯＨＣ型動弁装置において、前記吸，排気用ロッカアーム（21,22）は、それぞれロッカアーム本体（23）と、該本体（23）の先部に転動自在に軸支されて前記吸，排気カム（18,17）に接触するローラ（24）とよりなり、前記吸，排気カム（18,17）のカム面は、それぞれベース円部（18b,17b）と、該ベー

2

ス円部（18b,17b）より隆起するノーズ部（18n,17n）とを有すると共に、該ノーズ部（18n,17n）の立上がり部に上り緩衝曲線（Ci,Ce）が設定され、前記吸，排気用ロッカアーム（21,22）のうち、前記ノーズ部（18n,17n）がローラ（24）との接触を開始する際のノーズ部（18n,17n）の回転方向前側に偏位した方のロッカアーム（22）に対応するカム（17）の上り緩衝曲線（Ce）の緩衝曲線定数（$k\theta e$）が、その他方のロッカアーム（21）に対応するカム（18）の上り緩衝曲線（Ci）の緩衝曲線定数（$k\theta i$）よりも小さく設定されたことを特徴とする、内燃機関のＯＨＣ型動弁装置。
【発明の詳細な説明】
Ａ．発明の目的
(1)　産業上の利用分野
本発明は内燃機関の、ローラ付ロッカアームを備えた動

3

弁装置に関するものである。

(2)　従来の技術

従来内燃機関のOHC型動弁装置において、該装置に組み込まれるロッカアームを、ロッカアーム本体と、該本体の先部に伝動自在に軸支されて動弁カムに接触されるローラとよりなる、ローラ付ロッカアームとしたものでは、動弁カムの吸気および排気弁の開弁側の上り緩衝曲線を殆ど設けないのが普通である。

(3)　発明が解決しようとする問題点

ところでOHC型動弁装置において、ローラ付ロッカアームを備えたものでは、カムとロッカアームとの連接部の摩擦抵抗が低減されて機関性能、燃費の向上を図ることができるという利点がある反面このようなローラ付ロッカアームを備えた動弁装置はタペットクリアランスの外に、ロッカアーム本体と転動ローラとの間にもクリアランスが発生するため、これらのクリアランスが相乗して各部材間のたたかれ音がローラのないロッカアームを用いたものに比べて大きくなるという問題点がある。

そこで本出願人は既に動弁カムのカム面に開弁側の上り緩衝曲線を設け、これにより動弁カムによる吸，排気弁の開閉タイミングに何ら支障を及ぼさずにたたかれ音の低減を図るようにした動弁装置を提案している（特願昭60－149779号（特開昭62－10406号公報参照））。

而してさらに研究開発を重ねた結果によれば、動弁カム軸の両側に配設される一方の動弁系（たとえば吸気側動弁系）と他方の動弁系（たとえば排気側動弁系）では、カムノーズ部がローラとの接触を開始する際にローラを介してロッカアーム本体端部をリフトさせようとする力の、ロッカアーム軸側に向かう方向の分力が、吸，排気用ロッカアームとカム軸との相互位置及びカムの回転方向に関係して若干相違しており、即ち、上記接触開始の際のノーズ部の回転方向前側に偏位したロッカアーム側の上記分力の方がその回転方向後側に偏位したロッカアーム側のそれよりも大きくなり、このため、その前者のロッカアームでは、ローラとロッカアーム本体間の前記クリアランスの存在に起因して前記分力がローラとロッカアーム本体間で比較的大きな叩かれ音を発生させる傾向があることを本発明者は究明した。

本発明は上記に鑑み提案されたもので、前記2系統の動弁系をそれぞれ作動する動弁カムの開弁側の上り緩衝曲線の勾配を吸気側と排気側とで変える、即ち前記叩かれ音の多い側の動弁系を作動する動弁カムの上り緩衝曲線を、他方の動弁系を作動する動弁カムの上り緩衝曲線よりも緩勾配にすることで、上記叩かれ音の発生を全体として効果的に低減できるようにした、内燃機関のOHC型動弁装置を提供することを目的とする。

B.発明の構成

(1)　課題を解決するための手段

上記目的を達成するために本発明によれば、機体本体のシリンダヘッドに、吸，排気用カムを有する動弁カム

4

軸、および該カム軸の両側に対をなす吸，排気用ロッカアーム軸を設け、それらのロッカアーム軸に吸，排気用ロッカアームをそれぞれ揺動自在に支承し、前記吸，排気用ロッカアームの一端を前記吸，排気用カムにそれぞれ連接し、またそれらの他端を吸，排気弁に連接してなる、内燃機関のOHC型動弁装置において、前記吸，排気用ロッカアームは、それぞれロッカアーム本体と、該本体の先部に転動自在に軸支されて前記吸，排気用カムに接触するローラとよりなり、前記吸，排気用カム面は、それぞれベース円部と、該ベース円部より隆起するノーズ部とを有すると共に、該ノーズ部の立上がり部に上り緩衝曲線が設定され、前記吸，排気用ロッカアームのうち、前記ノーズ部がローラとの接触を開始する際のノーズ部の回転方向前側に偏位した方のロッカアームに対応するカムの上り緩衝曲線の緩衝曲線定数が、その他方のロッカアームに対応するカムの上り緩衝曲線の緩衝曲線定数よりも小さく設定される。

(2)　作　用

各ロッカアームにおいてロッカアーム本体とローラ間にはその間の軸受部等における不可避のガタ等に起因して多少のクリアランスが存在する。

ところで各カムのノーズ部がローラとの接触を開始する際（即ち各カムが対応する弁を開弁開始させる際）にローラを介してロッカアーム本体端部をリフトさせようとする力は、ロッカアーム軸側に向かう方向の分力を有しており、この分力のために、各ロッカアームではローラとロッカアーム本体相互間の上記クリアランスの存在に関係してその相互間で叩かれ音をそれぞれ発生させる。またこのような分力の大きさは、吸，排気用ロッカアーム軸とカム軸との相互位置及びカムの回転方向に関係して吸気カム側と排気カム側とで若干相違しており、即ち、上記接触開始の際のノーズ部の回転方向前側に偏位した一方のロッカアーム（以下に具体的に説明する実施例では排気用ロッカアーム22）側の上記分力（同実施例ではB）の方がその他方のロッカアーム（同実施例では吸気ロッカアーム21）側の上記分力（同実施例ではB′）よりも大きくなり、このため、その前者のロッカアームでは前記叩かれ音が比較的大きくなる傾向があるが、本発明の前記構成によれば、何れのカムのノーズの立上がり部にも上り緩衝曲線が設定され、その上、特に上記分力が大きい方のカム（同実施例では排気カム17）の上り緩衝曲線の緩衝曲線定数が、その他方のカム（同実施例では吸気カム18）の上り緩衝曲線の緩衝曲線定数よりも小さく設定されるため、何れの動弁系からの上記叩かれ音も可及的に低減される。

(3)　実　施　例

以下、図面により本発明の一実施例について説明する。

第1図においてSOHC型内燃機関の機関本体Eは、シリンダブロック1と、そのデッキ面上にガスケット3を介して結着されるシリンダヘッド2とを備える。

5

シリンダブロック1のシリンダボア4には、ビストン5が摺動自在に嵌合され、そのビストン5はコンロッド6を介してクランク軸（図示せず）に連動される。

前記シリンダヘッド2は吸気および排気が一方に流れる所謂クロスフロー型であって、前記ビストン5の頂面に対面する燃焼室7には、吸気ポート8と排気ポート9が連通される。シリンダヘッド2には、前記吸、排気用ポート8,9を開閉する吸、排気弁10,11が摺動可能に支承され、それら吸、排気弁10,11は弁ばね12,13によって閉じ方向に偏倚される。

シリンダヘッド2と、その上方に設けられるヘッドカバー14とで動弁室15が形成され、この動弁室15には、前記吸、排気弁10,11を作動するための動弁装置Vが設けられる。動弁室15内において、吸、排気弁10,11間には、図示しないクランク軸と平行に動弁カム軸16が回転自在に支承され、該軸16に吸、排気カム18,17が一体に設けられる。

動弁カム軸16上の両側において、シリンダヘッド2上には該軸16と略平行な一対のロッカアーム軸19,20が固着され、それらのロッカアーム軸19,20に吸気および排気側のローラ付ロッカアーム21,22が揺動自在に軸支され、それらのロッカアーム21,22は動弁カム16の吸、排気18,17と、吸、排気弁10、11の上端とを連接し、それらカム18,17の回転を吸、排気弁10,11にそれぞれ伝達する。

ローラ付ロッカアーム21,22は、第2図に明瞭に示すようにロッカアーム本体23と、その先部に回転自在に軸支されるローラ24とよりなり、前記ロッカアーム本体23は、その中央部に、前記ロッカアーム軸19あるいは20を貫通する軸孔25が穿設され、またその基端にタペットクリアランスの調節用調節ねじ26が螺合され、該ねじ26の下端が吸気弁10あるいは排気弁11の上端に当接される。

またロッカアーム本体23の先端は二又フォーク状に形成されてそこに穿設したローラ軸孔27にローラ軸28が固設され、このローラ軸28にニードル軸受29を介して前記ローラ24が転動自在に軸支され、該ローラ24は動弁カム軸16の吸、排気カム18,17に当接される。

いま図示しないクランク軸の回転に連動して動弁カム軸16が駆動されると、吸気および排気用ローラ付ロッカアーム21,22を介して吸、排気弁10,11は所定のタイミングで開閉作動される。

ところで前記動弁装置Vにおいて、ローラ付ロッカアーム22,23を用いると、ローラ軸28とニードル軸受29間、およびニードル軸受29とローラ軸孔27にそれぞれ多少のクリアランスが生じるのを避けられず、このクリアランスが、動弁装置のもつタペットクリアランスと相乗して動弁系に発生するたたかれ音が大きくなるという不具合を生じる。

また第1図において、動弁カム軸16が第1図矢印A方向に回転すれば、ローラ24が転動して吸、排気側ロッカア

6

ーム21,22はそれぞれロッカアーム軸19,20回りに揺動されて吸、排気弁10,11を開閉動作させる。このような過程において、吸、排気カム18,17のノーズ部18n,17nがローラ24との接触を開始する際にローラ24を介してロッカアーム本体23の端部をリフトさせようとする力は、対応するロッカアーム軸19,20側に向かう方向の分力B′,Bを有しており、この分力B′,Bのために、各ロッカアーム21,22ではローラ24とロッカアーム本体2相互間の前述のクリアランスの存在に起因してその相互間で叩かれ音を発生させる。またこのような分力の大きさは、吸、排気用ロッカアーム21,22とカム軸16との相互位置及びカム軸16の回転方向（具体的には上記ノーズ部18n,17nのローラ24との接触開始の際の回転方向）に関係して吸気カム18側と排気カム17側とで若干の差異があり、即ち、上記接触開始の際のノーズ部18n,17nの回転方向前側に偏位した一方のロッカアーム（図示例では排気用ロッカアーム22）側の上記分力Bの方がその他方のロッカアーム（図示例では吸気ロッカアーム21）側の上記分力B′よりも大きくなり、このため、その前者のロッカアーム22側、即ち排気弁系からの上記叩かれ音の方が大きくなる傾向がある。尚、動弁カム軸16の回転方向が前記逆方向（矢印Aと反対方向）の場合には、当然に前記叩かれ音は吸気弁系の方が大きくなる。

而して本発明に基づくこの実施例は、斯かる2系統の動弁系における叩かれ音の相違も考慮して何れの叩かれ音をも効果的に低減できるようにしたものであって、即ち、吸、排気カム18,17のカム面には、ベース円部18b,17bとそれから隆起するノーズ部18n,17nとが形成されるが、特にそのノーズ部18n,17nの立上がり部には上り緩衝曲線Ci,Ceが設定され、その上、特に上記分力が大きい方のカム（図示例では排気カム17）の上り緩衝曲線Ceの緩衝曲線定数$k\theta e$が、その他方のカム（同実施例では吸気カム18）の上り緩衝曲線Ciの緩衝曲線定数$k\theta i$よりも小さく（即ち勾配が弛くなるように）設定される。即ち、吸気カム18の回転角θi（deg.）排気カム17の回転角θe（deg.）、吸気カム18の上り緩衝曲線Ciのリフト量hi（mm）、排気カム17の上り緩衝曲線Ceのリフト量he（mm）とした時に第3図のようになり、また$k\theta e < k\theta i$であり、例えば$k\theta e = 0.02$　$k\theta i = 0.029$と設定される。

なお動弁カム16の回転方向が逆になれば当然に、$k\theta i < k\theta e$となる。

いま動弁カム軸16が回転されれば、吸、排気カム18,17により吸、排気側ロッカアーム21,22は交互に揺動され、吸、排気弁10,11が所定のタイミングを以て開閉作動されるが、前述のように吸、排気カム18,17のカム面には、それぞれ開弁側の上り緩衝曲線Ci,Ceを設けてあるので、吸、排気弁10,11は何れも緩慢に開弁され開弁時に生じるたたかれ音等の騒音が低減され、特に吸、排気系の動弁系のうち、より騒音が大きくなる側の動弁

7

系、この実施例では排気側の動弁系の上り緩衝曲線Ceの
緩衝曲線kθeを、他の動弁系、この実施例では吸気側
の動弁系の上り緩衝曲線Ciの緩衝曲線定数kθiよりも
小さくしたことにより一層効果的に前記たたかれ音が低
減される。

C.発明の効果

以上の実施例により明らかなように本発明によれば、動
弁カム軸の両側に対をなす吸、排気用ロッカアーム軸を
設けたOHC型動弁装置において、吸、排気用ロッカアー
ムをそれぞれローラ付きに構成すると共に、吸、排気カ
ムのノーズ部の立上がり部にそれぞれ上り緩衝曲線を設
定し、吸、排気用ロッカアームのうち、前記ノーズ部が
ローラとの接触を開始する際のノーズ部の回転方向前側
に偏位した方のロッカアームに対応するカムの上り緩衝
曲線の緩衝曲線定数を、その他方のロッカアームに対応
するカムの上り緩衝曲線の緩衝曲線定数よりも小さく設
定したので、各ロッカアームにおけるロッカアーム本体＊

10

8

＊とローラ相互間のクリアランスの存在等に関係して吸、
排気弁の開弁の際にそれらの動弁系より大きさの異なる
叩かれ音が発生するのを何れも有効に低減することがで
き、従って、上記ローラの採用により動弁系の摩擦抵抗
を軽減して機関性能の向上を図りながら、動弁系の作動
騒音を全体として効果的に低減することができる。

【図面の簡単な説明】

図面は本発明の一実施例を示すもので、第1図は本発明
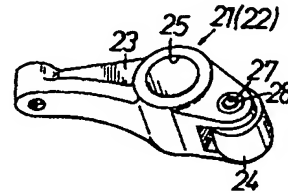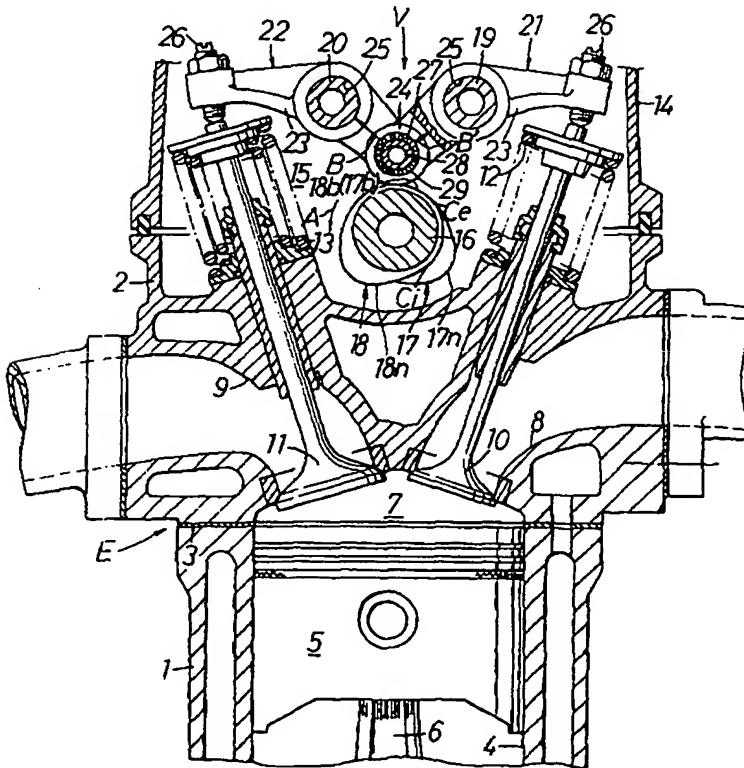装置を備えた内燃機関の一部の縦断面図、第2図はロー
ラ付ロッカアームの斜視図、第3図は吸、排気側の開弁
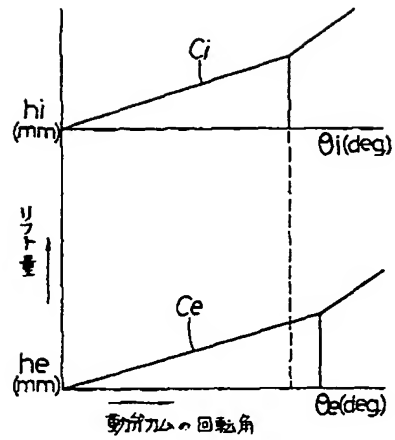側の上り緩衝曲線を示すグラフである。

E……機関本体、Ci,Ce……上り緩衝曲線、kθi,kθe
……緩衝曲線定数

2……シリンダヘッド、10,11……吸、排気弁、16……
動弁カム軸、18,17……吸、排気カム、19,20……ロッカ
アーム軸、21,22……ローラ付ロッカアーム、23……ロ
ッカアーム本体、24……ローラ

【第1図】

【第2図】

【第3図】

roller for inhalation of air and exhaust air.

By the way, in said moving valve mechanism V, if the rocker arms 22 and 23 with a roller are used, it is unavoidable that some path clearance arises, respectively between the roller shaft 28 and a needle bearing 29 and in a needle bearing 29 and the roller boss 27, it will be struck and the fault which this path clearance multiplies by the tappet clearance which a moving valve mechanism has, and is generated in a valve gear system that a sound becomes large will be produced.

Moreover, in Fig. 1 , if the valve train cam shaft 16 rotates in the direction of 1st [**] Fig. arrow-head A, a roller 24 rolls, and ** and the exhaust side rocker arms 21 and 22 will be rocked at the circumference of the rocker arm shaft 19 and 20, respectively, and will carry out the switching action of ** and the exhaust valves 10 and 11. such a process -- setting -- the nose of ** and exhaust cams 18 and 17 -- the force to which the lift of the edge of the rocker arm body 23 tends to be carried out through a roller 24 in case Sections 18n and 17n start contact on a roller 24 It has component-of-a-force B' of a direction which goes to corresponding rocker arm shaft 19 and 20 side, and B, and for this component-of-a-force B' and B, in each rocker arms 21 and 22, it originates in existence of a roller 24 and the above-mentioned path clearance between rocker arm body 23, and is struck by that mutual, and a sound is generated. Moreover, the magnitude of such component of a force With regards to the mutual location of **, the rocker arms 21 and 22 for exhaust air, and a cam shaft 16, and the hand of cut (specifically the above a nose the Sections [18n and 17n] roller 24 hand of cut in the case of contact initiation) of a cam shaft 16, there is some difference by the air inlet cam 18 and exhaust cam 17 side. The direction of the above-mentioned component of a force B by the side of a rocker arm (the example of illustration rocker arm 22 for exhaust air) becomes larger than above-mentioned component-of-a-force B' by the side of the rocker arm (the example of illustration inhalation-of-air rocker arm 21) of that another side. the nose in the case of the above-mentioned contact initiation -- for this reason, while biasing to the Sections [18n and 17n] before [a hand of cut] side There is an inclination of an exhaust valve system for it to be struck the account of a top and for the direction of a sound to become large, the rocker arm 22 side of the former. in addition -- the case where the hand of cut of the valve train cam shaft 16 is said hard flow (an arrow head A and opposite direction) -- natural -- said -- it is struck and, as for a sound, the direction of an inlet-valve system becomes large.

Are struck, and also take a difference of a sound into consideration, any are struck, and it enables it to also reduce a sound effectively. it ** and this example based on this invention can be set to these two valve gear systems -- namely, -- ** and the cam side of exhaust cams 18 and 17 -- the base round parts 18b and 17b -- and the upheaving nose, although Sections 18n and 17n are formed Go up to the Sections [18n and 17n] start section, and the buffer curves Ci and Ce are set up. especially -- the nose -- the buffer curvilinear constant kthetae of the uphill buffer curve Ce of a cam with the larger moreover, especially above-mentioned component of a force (the example of illustration exhaust cam 17) is set up smaller (that is, inclination becomes loose -- as) than the buffer curvilinear constant kthetai of the uphill buffer curve Ci of the cam (this example air inlet cam 18) of the another side. That is, when it considers as angle-of-rotation thetae (deg.) of the angle-of-rotation thetai (deg.) exhaust cam 17 of an air inlet cam 18, the amount hi of lifts of the uphill buffer curve Ci of an air inlet cam 18 (mm), and the amount he of

lifts of the uphill buffer curve Ce of an exhaust cam 17 (mm), it becomes as it is shown in Fig. 3 , and it is kthetae<kthetai, for example, is set up with kthetae=0.02kthetai=0.029. In addition, if the hand of cut of a valve train cam 16 becomes reverse, naturally it will become kthetai<kthetae.

if the valve train cam shaft 16 rotates now, ** and the exhaust side rocker arms 21 and 22 will be rocked by turns by ** and exhaust cams 18 and 17 -- having -- timing predetermined in ** and exhaust valves 10 and 11 -- with, although closing motion actuation is carried out As mentioned above in ** and the cam side of exhaust cams 18 and 17 Since the uphill buffer curves Ci and Ce by the side of valve opening are formed, respectively, each opens slowly, ** and exhaust valves 10 and 11 are produced and struck at the time of valve opening, and noise, such as a sound, is reduced. The near valve gear system with which the noise becomes large more among the valve gear systems of ** and an exhaust air system especially, having made the buffer curve kthetae of the uphill buffer curve Ce of the valve gear system of an exhaust side smaller in other valve gear system and this example than the buffer curvilinear constant kthetai of the uphill buffer curve Ci of the valve gear system of an inspired air flow path in this example -- much more -- effective -- said -- it is struck and a sound is reduced.

C. According to the example more than an effect of the invention, according to this invention, so that clearly In the OHC mold moving valve mechanism which prepared ** which makes a pair, and the rocker arm shaft for exhaust air in the both sides of a valve train cam shaft, while constituting ** and the rocker arm for exhaust air with a roller, respectively An uphill buffer curve is set as the start section of the section, respectively. the nose of ** and an exhaust cam -- said nose among ** and the rocker arm for exhaust air -- the nose at the time of the section starting contact on a roller -- the buffer curvilinear constant of the uphill buffer curve of the cam corresponding to the rocker arm of the direction biased to the before [a hand of cut] side of the section Since it set up smaller than the buffer curvilinear constant of the uphill buffer curve of the cam corresponding to the rocker arm of the another side It can reduce effectively each that it is struck and a sound occurs [from which magnitude differs from those valve gear systems with regards to the existence of a rocker arm body and the path clearance between rollers in each rocker arm etc. in the case of valve opening of ** and an exhaust valve]. Therefore, the actuation noise of a valve gear system can be reduced effectively as a whole, mitigating the frictional resistance of a valve gear system by adoption of the above-mentioned roller, and aiming at improvement in an engine performance.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
It is the graph with which a drawing shows one example of this invention, some drawings of longitudinal section of the internal combustion engine with which Fig. 1 was equipped with this invention equipment, and Fig. 2 show the perspective view of a rocker arm with a roller, and Fig. 3 shows the uphill buffer curve by the side of ** and valve opening of an exhaust side.
E .... An engine body, Ci, Ce .. An uphill buffer curve, kthetai, kthetae .. Buffer curvilinear constant
2 [.. 19 **, an exhaust cam 20 / .. 21 A rocker arm shaft, 22 / .. A rocker arm with a roller 23 / .. A rocker arm body, 24 / .. Roller] .... 10 The cylinder head, 11 .. **, an exhaust valve, 16 .. 18 A valve train cam shaft, 17

[Translation done.]

* NOTICES *

DRAWINGS

Bibliography

[Judge] Mihara Akihide
(56) [Reference]
[References] JP,53-112320,A (JP, A)
[References] The microfilm which photoed the contents of the specification attached to the application of an application for utility model registration No. (JP,50-27211,U) 80377 [Showa 48 to], and the drawing (JP, U)

[Translation done.]

* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1] To the cylinder head (2) of the engine body (E) characterized by providing the following ** which makes a pair, and the rocker arm shaft for exhaust air (19 20) are prepared in the both sides of **, the valve train cam shaft (16) which has an exhaust cam (18 17), and this cam shaft (16). ** and the rocker arm for exhaust air (21 22) are supported respectively free [rocking] on these rocker arm shaft (19 20). An internal combustion engine's OHC mold moving valve mechanism the end of said ** and the rocker arm for exhaust air (21 22) is connected [mold], respectively, and it comes [mold] to connect [exhaust cam / (18 17) / said ** and] those other ends at ** and an exhaust valve (10 11) Said ** and the rocker arm for exhaust air (21 22) are a rocker arm body (23), respectively. Consisting of a roller (24) which is supported to revolve by the point section of this body (23) free [rolling], and contacts said ** and an exhaust cam (18 17), said ** and the cam side of an exhaust cam (18 17) are a base round part (18b, 17b), respectively. the nose which upheaves from this base round part (18b, 17b) -- the section (18n, 17n)

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
A. The purpose of invention (1) Field-of-the-invention this invention on industry relates to the moving valve mechanism equipped with an internal combustion engine's rocker arm with a roller.
(2) Usually hardly prepare the uphill buffer curve by the side of the inhalation of air of a valve train cam, and valve opening of an exhaust valve conventionally [Prior-art] what used the rocker arm included in this equipment in an internal combustion engine's OHC mold moving valve mechanism as the rocker arm with a roller which consists of a rocker arm body and a roller which it is supported to revolve free [transmission in the point section of this body], and is contacted by the valve train cam.
(3) In the trouble which invention tends to solve, and the thing equipped with the rocker arm with a roller in the OHC mold moving valve mechanism in time The moving valve mechanism equipped with such a rocker arm with a roller while there was an advantage that the frictional resistance of the articulated section of a cam and a rocker arm was reduced, and improvement in an engine performance and fuel consumption could be aimed at besides a tappet clearance Since path clearance occurs also between a rocker arm body and a rolling roller, there is a trouble of becoming large compared with the thing using the rocker arm in which such path clearance multiplies, it is struck between each part material, and a sound does not have a roller.
Then, these people already prepared the uphill buffer curve by the side of valve opening in the cam side of a valve train cam, and have proposed the moving valve mechanism which is struck without this exerting trouble on ** by the valve train cam, and the closing motion timing of an exhaust valve at all, and aimed at reduction of a sound (Japanese Patent Application No. No. (refer to JP,62-10406,A) 149779 [60 to]).
According to the result of having **(ed) and having repeated researches and developments further, while is arranged in the both sides of a valve train cam shaft. In a valve gear system (for example, inspired air flow path valve gear system) and the valve gear system (for example, exhaust side valve gear system) of another side The force to which the lift of the edge of a rocker arm body tends to be carried out through a roller in case the cam-nose section starts contact on a roller, Relating with the component of a force of the direction which goes to a rocker arm shaft side, are different from the mutual location of **, the rocker arm for exhaust air, and a cam shaft, and the hand of cut of a cam a little. The direction of the above-mentioned component of a force by the side of the rocker arm biased to the before [a hand of cut] side of the section becomes larger than it by the side of the rocker arm biased to that method Kogo side of rotation. namely, the nose in the case of the above-mentioned contact initiation -- for this reason In the rocker arm of the former, this invention person studied that it originated in existence of said path clearance between a roller and a rocker arm body, and there was an inclination between a roller and a rocker arm body for said component of a force to be comparatively big and for it to be struck and to generate a sound.
This invention was proposed in view of the above, and change the inclination of the

uphill buffer curve by the side of valve opening of the valve train cam which operates said two valve gear systems, respectively by the inspired air flow path and the exhaust side. The uphill buffer curve of said valve train cam which is struck and operates the valve gear system of a side with many sounds by namely, the thing for which the valve gear system of another side is made into low-gradient rather than the uphill buffer curve of the valve train cam which operates It aims at offering an internal combustion engine's OHC mold moving valve mechanism which is struck the account of a top and enabled it to reduce generating of a sound effectively as a whole.

B. Configuration of invention (1) In order to attain the The means for solving a technical problem above-mentioned purpose, according to this invention The valve train cam shaft which has ** and a cam for exhaust air in the cylinder head of the body of an airframe, And ** which makes a pair, and the rocker arm shaft for exhaust air are prepared in the both sides of this cam shaft. ** and the rocker arm for exhaust air are supported respectively free [rocking] on those rocker arm shafts. In an internal combustion engine's OHC mold moving valve mechanism the end of said ** and the rocker arm for exhaust air is connected [mold], respectively, and it comes [mold] to connect [cam / said ** and / for exhaust air] those other ends at ** and an exhaust valve Said ** and the rocker arm for exhaust air consist of a roller which is supported to revolve respectively free [rolling in the point section of a rocker arm body and this body], and contacts said ** and the cam for exhaust air. Said ** and the cam side for exhaust air the nose which upheaves from a base round part and this base round part, respectively, while having the section It goes up to the start section of the section, and a buffer curve is set up. this -- a nose -- among said ** and the rocker arm for exhaust air said nose -- the nose at the time of the section starting contact on a roller -- the buffer curvilinear constant of the uphill buffer curve of the cam corresponding to the rocker arm of the direction biased to the before [a hand of cut] side of the section is set up smaller than the buffer curvilinear constant of the uphill buffer curve of the cam corresponding to the rocker arm of the another side.

(2) ** In each ** rocker arm, it originates between a rocker arm body and a roller at the unescapable backlash in bearing in the meantime etc., and some path clearance exists. by the way, the nose of each cam -- the force to which the lift of the edge of a rocker arm body tends to carry out through a roller in case the section starts contact on a roller (namely, when valve-opening initiation of the valve to which each cam is equivalent is carried out) has the component of a force of the direction which goes to a rocker arm shaft side, is struck by that mutual with regards to existence of a roller and the above-mentioned path clearance between rocker arm bodies, and generates a sound in each rocker arm, respectively for this component of a force. Moreover, the magnitude of such component of a force is different a little by the air inlet cam and exhaust cam side with regards to the mutual location of **, the rocker arm shaft for exhaust air, and a cam shaft, and the hand of cut of a cam. that is While biased to the before [a hand of cut] side of the section. the nose in the case of the above-mentioned contact initiation -- the rocker arm (this example inhalation-of-air rocker arm 21) side of the another side the above-mentioned component of a force [the direction of the above-mentioned component of a force (this example B) by the side of a rocker arm (at the example explained concretely below, it is the rocker arm 22 for exhaust air)] (-- it becoming large and there being said inclination for it to be struck and for a sound to become comparatively large, by the

rocker arm of that former rather than B'), for this reason, but in this example According to said configuration of this invention, go up also to the start section of the nose of which cam, and a buffer curve is set up. Since the buffer curvilinear constant of the uphill buffer curve of a cam with the larger moreover, especially above-mentioned component of a force (this example exhaust cam 17) is set up smaller than the buffer curvilinear constant of the uphill buffer curve of the cam (this example air inlet cam 18) of the another side, It is struck the account of a top from which valve gear system, and a sound is also reduced as much as possible.

(3) Fruit ** A drawing explains one example of this invention below an example.

In Fig. 1, a SOHC mold internal combustion engine's engine body E is equipped with a cylinder block 1 and the cylinder head 2 bound through a gasket 3 on the deck side. Fitting of the sliding of a piston 5 is made free to the cylinder bore 4 of a cylinder block 1, and the piston 5 is interlocked with a crankshaft (not shown) through a connecting rod 6. Said cylinder head 2 is the so-called cross-flow mold with which inhalation of air and exhaust air flow to one side, and a suction port 8 and the exhaust air port 9 are opened for free passage by the combustion chamber 7 which meets the top face of said piston 5. Bearing of the sliding of said **, ** which open and close the ports 8 and 9 for exhaust air, and exhaust valves 10 and 11 is made possible to the cylinder head 2, and ******** and exhaust valves 10 and 11 are deflected by valve springs 12 and 13 in the direction of closing.

The valve train room 15 is formed with the cylinder head 2 and the cylinder-head cover 14 prepared in that upper part, and the moving valve mechanism V for operating said ** and exhaust valves 10 and 11 is formed in this valve train room 15. Bearing of the rotation of the valve train cam shaft 16 is made free to the KUKANKU shaft and parallel which are not illustrated between **, an exhaust valve 10, and 11 in the valve train room 15, and ** and exhaust cams 18 and 17 are formed in this shaft 16 at one.

The rocker arm shafts 19 and 20 of an parallel pair fix. the both sides on the valve train cam shaft 16 -- setting -- a cylinder head 2 top -- this shaft 16 and abbreviation -- Inhalation of air and the rocker arms 21 and 22 with a roller of an exhaust side are supported to revolve by those rocker arm shafts 19 and 20 free [rocking]. Those rocker arms 21 and 22 ** of a valve train cam 16, and exhaust air 18 and 17, The upper limit of ** and exhaust valves 10 and 11 is connected, and rotation of these cams 18 and 17 is transmitted to ** and exhaust valves 10 and 11, respectively.

The boss 25 to which said rocker arm body 23 penetrates said rocker arm shaft 19 or 20 in the center section is drilled by the rocker arms 21 and 22 with a roller consisting of a rocker arm body 23 and a roller 24 supported to revolve by the point section free [rotation], as clearly shown in Fig. 2, and the adjusting screw 26 for accommodation of a tappet clearance is screwed in the end face, and the lower limit of this **** 26 is contacted by the upper limit of an inlet valve 10 or an exhaust valve 11. Moreover, the roller shaft 28 is fixed to the roller boss 27 which it was formed in the shape of a branch fork, and was drilled there, the tip of the rocker arm body 23 is supported to revolve by this roller shaft 28 free [rolling of said roller 24] through a needle bearing 29, and this roller 24 is contacted by ** of the valve train cam shaft 16, and exhaust cams 18 and 17. If rotation of the crankshaft which is not illustrated now is interlocked with and the valve train cam shaft 16 drives, closing motion actuation of ** and the exhaust valves 10 and 11 will be carried out to predetermined timing through the rocker arms 21 and 22 with a

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Bibliography

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(19) [Publication country] Japan Patent Office (JP)
(12) [Kind of official gazette] Open patent official report (A)
(11) [Publication No.] JP, 7-68892, A
(43) [Date of Publication] March 14, Heisei 7 (1995)
(54) [Title of the Invention] Printer
(51) [International Patent Classification (6th Edition)]
B41J 21/00   Z
G06F 3/12   F
G06K 7/10   P 9191-5L
[Request for Examination] Un-asking.
[The number of claims] 1
[Mode of Application] OL
[Number of Pages] 12
(21) [Application number] Japanese Patent Application No. 5-221684
(22) [Filing date] September 7, Heisei 5 (1993)
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[Translation done.]

Epitome

(57) [Abstract]
[Objects of the Invention] The printer which does automatically all
activities until it carries out the printout of the total result to a
form form from a data input by easy actuation, not using a host device
is offered.
[Elements of the Invention] A printer 1 is equipped with a slot 2-1, 2-2,
the actuation display 3, a mark sheet reader 4, and form cassette
insertion opening 5 grade, equips the interior of equipment with the
printing section and a control section, performs predetermined printing
in a form, and discharges a printed form in the paper output tray
section 7 with the delivery roller 6. For example, if equip a slot 2-1
with the soft curd 8 with which golf scorecard software was stored, a
mark sheet reader 4 is made to read the mark of the scorecard for every
player and easy alter operation is performed from the actuation display
3, a score will be totaled automatically, a gross and a network will be
computed for every player, ranking will be attached, and a printout will
be carried out in predetermined golf competition scorecard form. Copy
printing of several competition participant minutes may be carried out
with a fixed form form, a plotter is connected, and a printout can be
carried out to the large-sized form for the hall notice.

[Translation done.]
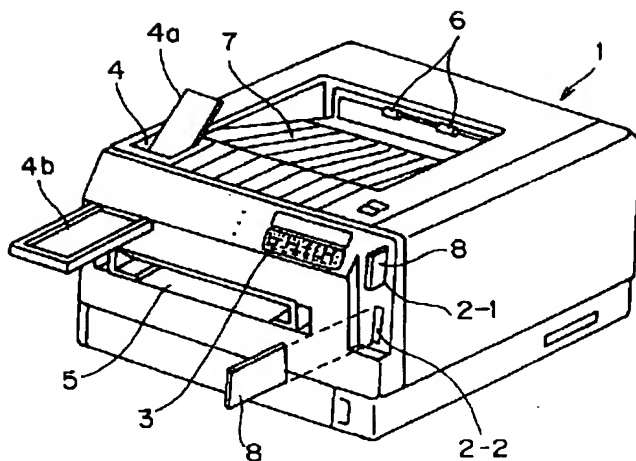
[Translation done.]

CLAIMS

[Claim(s)]
[Claim 1] The printer characterized by providing the following The mark
sheet reader which reads the information written in the mark sheet The
printing control means which compounds and carries out the printout of
the processing unit which processes the information read by this mark
sheet reader according to a predetermined principle, the form memory
which memorizes the form information for printing the result of an
operation of this processing unit, a text generating means generate the
text corresponding to the result of an operation of said processing unit,
the text which this text generating means generated, and the form
information memorized by said form memory

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the printer which
reads the information written in the mark sheet form, and carries out a
printout in predetermined form.
[0002]
[Description of the Prior Art] At the golf competition which contests by
many men gathering conventionally, after game termination, the ranking
of game results is announced and usually commends a person with
excellent results, the person who occupied predetermined ranking. For
this reason, those who became an organizer collect all participants'
scorecards after game termination, and post the name of the participants
in each all the members, the score of an outside track, the score of an
inside corner, a handicap, etc. to the big predetermined column of a
form form to extent which all the members can look through by at the
assembly [of an exhibition]. And after adding a postscript to the
column which computes each gross and network and corresponds a
calculation result, these networks were compared, ranking was filled in
and a series of activities of ******ing for the hall were done.
[0003] However, since all of these activities are handicraft, they are
very complicated and require much time amount. therefore, those who
became an organizer -- occasionally -- bathing immediately after game
termination -- eating and drinking at ****** and the announcement hall -
- as -- not becoming -- ** -- saying -- inconvenience -- **** -- there
are many things.
[0004] By the way, the application software which totals the score of a
scorecard with development of the OA equipment of these days, using a
personal computer etc. as what solves the above problems, and computes
ranking is marketed. Moreover, a computer is used not only for totaling

the result in which a lot of people competed for the game in this way but for the activity of totaling a lot of people's candidate's results result, and laborsaving is measured.
[0005]
[Problem(s) to be Solved by the Invention] However, when doing such an activity using OA equipment, both the highly efficient host device which processes data, such as a personal computer and an office computer, and the printer which prints the total result etc. are surely required. Thus, in the system of the OA equipment which combined the host device and the printer, the whole system was enlarged and there was a problem that a system price will also become an expensive considerable thing.
[0006] Moreover, the application software carried not only in it but in the host computer was operated, and when skilled in neither actuation of a computer nor the operation of application software, there was a problem that an activity could not be advanced easily, until it performed data processing and carried out the printout of the result.
[0007] Moreover, in the competition of a game, it was that in which the dissatisfaction that there are few advantages as compared with there being no great difference in many cases, and use of such OA equipment being having only saved labor the check of a total and the activity of ranking calculation as a result by the time amount which inputs a score into a host device, and the time amount posted to a form form in direct handwriting, and using an expensive and large-scale system remains.
[0008] This invention aims at offering the printer which does automatically all activities until it carries out the printout of the total result to a form form from a data input by easy actuation, not using a host device in view of the above-mentioned conventional actual condition.
[0009]
[Means for Solving the Problem] Below, the configuration of the printer concerning this invention is described. The mark sheet reader which reads the information by which the printer of this invention was written in the mark sheet form, The processing unit which processes the information which this mark sheet reader read according to a predetermined principle, The form memory which memorizes the form information for printing the result of an operation of this processing unit, It consists of printing control means which compound and carry out the printout of a text generating means to generate the text corresponding to the result of an operation of the above-mentioned processing unit, and the form information memorized by the text which this text generating means generated, and the above-mentioned form

memory.

[0010] the above-mentioned mark sheet reader -- for example, -- from the existing mark sheet reader etc. -- becoming -- a processing unit -- for example, CPU (Central-Processing-Unit) etc. -- from -- it becomes, form memory consists of a ROM (Read-Only-Memory) included for example, in the application card, and a text generating means and a printing control means consist of CPU, a system ROM, a subsystem only for image-data processings, etc.

[0011]

[Function] If this invention reads the information by which the mark sheet reader was written in the mark sheet and a processing unit processes this read information according to a predetermined principle, a text generating means will generate the text corresponding to the result of an operation of a processing unit. And a printing control means compounds and carries out the printout of the form information memorized by above-mentioned text and form memory.

[0012] Thereby, all activities until it carries out the printout of the total result to a form form from a data input can be automatically done now by easy actuation, not using a host device.

[0013]

[Example] Hereafter, it explains in full detail, referring to a drawing about the example of this invention. Drawing 1 is the appearance perspective view of the printer concerning the first example. As shown in this drawing, the printer 1 equips the front right-hand side of equipment with the mark sheet reader 4 in the slot 2-1 for cards of two upper and lower sides, 2-2, and the front upper part the actuation display 3 and on the left-hand side of top-face anterior part. Moreover, in the center of a front face of equipment, the form cassette insertion opening 5 and the up back are equipped with the delivery roller 6 which discharges a printed form, and the paper output tray section 7 which lays the printed form discharged is formed in this side. And especially the interior of the body of equipment is equipped with the printing section which consists of the feed equipment which is not illustrated, a printer, a transport device, an anchorage device, etc., and the control section mentioned later in detail, and it also has the function of the usual page printer which prints by connecting with the host computer other than the special print facility which also mentions this later.

[0014] The above-mentioned slot 2-1 for cards and 2-2 are equipped with the soft curd (memory card) 8 which stored the application software for separating a printer 1 from connection of a host computer, and performing a special print uniquely free [****]. Moreover, the

actuation display 3 is equipped with the various actuation keys and liquid crystal display screen for a data input. And the mark sheet reader 4 has mark sheet insertion opening equipped with guide plate 4a, and the mark sheet exhaust port equipped with tray 4b, and has the reader which reads data in the mark sheet inserted inside equipment.

[0015] After a user equips the slot 2-1 for cards, or 2-2 with soft curd 8, equips the form cassette insertion opening 5 with the form cassette outside drawing and makes a mark sheet reader 4 read a predetermined mark sheet, he can key a data requirement from the actuation display 3, and can make for example, the game scorecard of the number of sheets of the request which becomes a printer 1 from desired form etc. print. A printer 1 performs predetermined printing in the form contained by the form cassette, and discharges a printed form on the paper output tray section 7 with the delivery roller 6.

[0016] Next, drawing 2 is the block diagram showing the whole control-section configuration arranged in the interior of a printer 1. As shown in this drawing, to the bus line 11 of the printer control section 10 The above-mentioned actuation display 3 and the slot 2-1 for cards, and 2-2 are connected. Furthermore CPU (Central-Processing-Unit) 12, a system (ROM:Read-Only-Memory) ROM 13, systems RAM (RAM:Random-Access-Memory) 14 and FRAM16, And printer I/F (I/F: interface) 17 is connected, and printer engine 18 is connected through this printer I/F17. And further, mark sheet reader controller 4c is connected, and reader 4d is connected through this mark sheet reader controller 4c. Hereafter, these configurations are explained.

[0017] The actuation display 3 outputs the actuation information which it keys in order to perform printing processing to CPU12, and displays the information which should be reported to a user corresponding to the above-mentioned actuation by control from CPU12.

[0018] It is equipped with the slot 2-1 for cards, and soft curd 8, and soft curd 8 contains AP-ROM8a. The specific form data for an application program for a printer 1 to perform special printing processing uniquely not using a host computer or a printout are stored in AP-ROM8a. Moreover, the slot 2-2 for cards is equipped with the soft curd 8 for CG which contains CG memory. This CG memory is ROM which memorizes the character-pattern data (font data and font data) corresponding to the character code contained in printing information.

[0019] Mark sheet reader controller 4c detects the mark sheet inserted in insertion opening 4a, and drives reader 4d, and reader 4d outputs the data read in the mark sheet to CPU12.

[0020] a system ROM 13 coordinates a printer 1 with a host computer, the

basic program in the case of it being usually alike and making it operate is stored, and CPU12 performs control of the print processing based on the printing information sent out from a host computer based on the program read from the system ROM 13.

[0021] A system RAM 14 is equipped with an application program field, and memorizes temporarily the application program read from AP-ROM8a of soft curd 3 till special printing processing termination original with a printer. Moreover, it has the storage region used as a work area, and the keypad information inputted from the actuation display 4, the middle data generated by CPU12 during processing are memorized temporarily. Furthermore, it has a page buffer field for one sheet of form, and the processing assignment information called the pseudo code or internal code which consists of the addresses of the memory (AP-ROM8a) which should be accessed in order to read each processing assignment information which CPU12 performs, i.e., printing information, etc. is memorized in order of printing.

[0022] FRAM16 is a frame memory which has the capacity which stores the pattern data for one sheet of form. If it recognizes that FRAM16 is in the condition of pattern data which can be developed, CPU12 reads a pseudo code from the page buffer field of the system RAM 14 mentioned above, analyzes this, generates pattern data with the soft curd 8 for CG based on the obtained result, will write in the pattern data one by one on the predetermined address of FRAM16, and will develop. And completion of expansion of the pattern data for one sheet of form transmits pattern data to printer engine 18 through printer I/F17.

[0023] Printer engine 18 constitutes the printer of the printing section stated by explanation of drawing 1 . The pattern data by which the transfer was carried out [above-mentioned] are followed. For example, an LED print head, Drive the print head which consists of a laser print head etc., and information write-in [optical] is generated. A photo conductor is exposed by the optical writing, an electrostatic latent image is formed on a photo conductor, the electrostatic latent image is developed in a toner image, the toner image is imprinted in a form, and it is constituted by the print processing section of the electrophotography method which prints by carrying out heat fixing of the form toner image.

[0024] Moreover, in case a printer 1 is used as usual printer equipment, host I/F19 for connecting the host devices 20, such as a personal computer, is connected to the above-mentioned bus line 11. This host I/F19 is equipped with parallel I/F for connecting large-sized host devices, such as a large-sized computer besides serial I/F for

connecting small host devices, such as a personal computer and a workstation.

[0025] Next, the configuration of the mark sheet which the above-mentioned mark sheet reader 4 is made to read is explained taking the case of the case where it applies to the scorecard of golf. First, the player name block 31 which is a mark block of the beginning of a scorecard is shown in drawing 3 . This player name block 31 consists of four lines, 3 ****s of each line are turned sideways, the alphabet of 26 characters is printed together with the side of one line in 1 partition, and the rounded envelope for a mark is printed under each alphabetic character. And in the example of this drawing, the mark is entered in the rounded envelope under the alphabet O, Z, A, K, I, M, A, S, A, R, and U which spells in order the identifier of the Ozaki ** which is the owner of this scorecard in Roman alphabet from the head partition of the first line 31-1 to the partition of the last of the line 31-4 of a tail, respectively. A mark sheet reader 4 reads these marks, and recognizes "OZAKIMASARU."

[0026] Next, the outside track score block 32 which is the next mark block of a scorecard is shown in drawing 4 . This outside track score block 32 is the score block 32-1 of four persons' player which constructs the course distance (YARDAGE) from two tea, the standard number of times at bat (PAR), and this party on the right from the left a hole number (NO), difficulty (HCP), and approximately, 32-2, and 32-3 list from each column of 32-4. Corresponding to hole number (NO)1-9 of an outside track, it turns 9 ****s of each column down from the top. The entry location 32-5-2 which marks the number like that of 1 on one partition as the entry location 32-5-1 which marks the number like that of 10 of a score is formed. Corresponding to 0 and 1, and them which show the number like that of 10, it prepares immediately downward, and the rounded envelope for a **** mark is printed by the entry location 32-5-1 which marks the number like that of 10. Moreover, corresponding to 0-9, and them which show the number like that of 1, it prepares immediately downward, and the rounded envelope for a **** mark is printed by the entry location 32-5-2 which marks the number like that of 1. There is no entry of a mark in the entry location 32-5-1 which marks the number like that of 10 of the block of the No. 1 hole of the score block 32-4 (player "Nakajima") in the example of this drawing, and the mark is entered in several 6 lower rounded envelope in the entry location 32-5-2 which marks the number like that of 1. Usually, by persons other than a beginner (beginner), it is very rare to take out ten or more scores with one hole, also in this example, there is no mark

in the number like that of 10, and, as for the block of the No. 1 hall in in other players "Ozaki", "Nakamura", and "Murakami", the mark is entered in the rounded envelope corresponding to 4, 5, and 6 of the number like that of 1. A mark sheet reader 4 reads these marks, and recognizes it as the scores of the No. 1 hall in in a player "Ozaki", "Nakamura", "Murakami", and "Nakajima" being "4", "5", "6", and "6", respectively. The same is said of the hole after No. 2.

[0027] Then, the inside corner score block 33 which is the next mark block of a scorecard is shown in drawing 5 . Each column of two course distance (YARDAGE), the standard number of times at bat (PAR), and the score block four persons' player is prepared in the right from the left like the outside track score block 32 mentioned above by this inside corner score block 33 a hole number (NO), difficulty (HCP), and approximately. Corresponding to hole number (NO)10-18 of an inside corner, as for each column, the entry partition 33-1 of the outside track score sum total, the entry partition 33-2 of the inside corner score sum total, out and the entry partition 33-3 of Inn's score sum total, the entry partition 33-4 of a handicap, and the entry partition 33-5 of a net score are further formed with nine entry partitions downward from the top at the lower part.

[0028] The rounded envelope for a mark corresponding to 0-9, and they which show the number like the rounded envelope for a mark corresponding to 0-9, and them which show the number like that of 10, and that of 1 is printed up and down by the entry partition 33-1 of the outside track score sum total, and the entry partition 33-2 of the inside corner score sum total, respectively. In the example of mark entry shown in this drawing, as for the mark of the entry partition corresponding to the out (OUT) of the score block 32-1 (player "Ozaki"), a score shows that it is "41", and the mark of the entry partition corresponding to Inn (IN) shows in it that a score is "43."

[0029] Moreover, the rounded envelope for a mark corresponding to 0 and 1, and they which show the number like that of 100 under Kaminaka, the rounded envelope for a mark corresponding to 0-9, and they which show the number like that of 10, and the rounded envelope for a mark corresponding to 0-9, and they which show the number like that of 1 are printed by the entry partition 33-3 of out and Inn's score sum total, respectively. In the example of this drawing, the mark of the entry partition corresponding to the sum total (TOTAL) of the score block 32-1 shows that the score sum total is "84."

[0030] And the rounded envelope for a mark corresponding to 0-4, and they which show the number like that of 10, and the rounded envelope for

a mark corresponding to 0-9, and they which show the number like that of 1 are printed up and down by the entry partition 33-4 of a handicap, respectively. Usually, an official handicap has the place where 0 and a minimum have permitted the handicap 40 also to a normal member depending on a course (crab) in the case of a beginner although an upper limit is 36. This drawing has set up even 4 as a number like that of 10 so that it can respond also in such a case. In the example of this drawing, the mark of the entry partition corresponding to the handicap (HANDICAP) of the score block 32-1 shows that a handicap is 12.

[0031] The printing completely same in the entry partition 33-5 of a net score as the entry partition 33-3 of out and Inn's score sum total is made by the last. And in the example of this drawing, the mark of the entry partition corresponding to a net score (NET SCORE) shows that a network is "72."

[0032] Next, the printer 1 of the first example of a configuration of having mentioned above reads the above mark sheets, and explains using the flow chart which shows the processing actuation which carries out a printout in predetermined form to drawing 6 . In addition, this processing equips with desired soft curd 8 (in this case, soft curd 8 for golf competitions) the slot 2-1 for cards which a user shows to drawing 1 , and is started by performing the key input by an Enter key etc. from the actuation display 3 by CPU12 of a control section 10 shown in drawing 2 . Moreover, in this processing, one in the counter of built-in in CPU12 is set as a player counter. As for this player counter, the contents are cleared by initial setting.

[0033] First, the display which asks the display screen of the actuation display 3 for the input of the number of players is performed (step S1). Here, the participating total number of "20" and a competition is inputted by the user from the numerical keypad of the actuation display 3.

[0034] Next, it distinguishes whether the input of the above-mentioned number is termination (step S2). And if the key input which shows correction or cancellation by the user is made (S2, N), it will return to the above-mentioned step S1. The number display inputted accidentally is eliminated by this, and the display which asks for the input of the number of players again is performed.

[0035] On the other hand, if the key input which directs activation by the user is made (S2, Y), the number of players "20" by which the key input was carried out [above-mentioned] is stored in the predetermined field of a system RAM 14 (step S3).

[0036] Then, the display which asks for insertion of a scorecard (mark

sheet) is performed (step S4), and it distinguishes whether the scorecard was inserted in the mark sheet reader 4 (step S5), and step S4 and S5 are repeated until a scorecard is inserted. A scorecard is inserted each one for every player which ended the game, because the manager is only present, he may do, or a manager collects the scorecards of all players, and you may make it insert here.

[0037] And the mark of a scorecard will be read if a scorecard is inserted in a mark sheet reader 4 (S5, Y) (step S6). Thereby, the mark of the identifier (each entry partition of drawing 3) of a player, a handicap (entry partition 33-4 of the score block 32-1 of drawing 5), and the score (entry partition corresponding to the hole numbers 1-18 of drawing 3 and the score block 32-1 of drawing 4) for every hole is read, and the location data of these *********** mark are once stored in the predetermined field of a system RAM 14.

[0038] Next, it distinguishes whether all the data of a scorecard were read (step S7). This processing is processing which investigates the location data of a mark in which the identifier stored in the predetermined field of the above-mentioned system RAM 14, a handicap, and the score for every hole are shown, and distinguishes whether there is any entry partition in which at least one data is not stored among these.

[0039] If there is an entry partition in which data are not stored, it will judge that it is omission in entry of a mark (S7, N), and after performing a being [omission in entry]-in this case **** alarm display (step S8), the above-mentioned data of a system RAM 14 clear the field once stored (step S9), and return to the above-mentioned step S5.

[0040] Thus, when the omission in entry of a mark is in the inserted scorecard, a user inserts again the scorecard in which the mark was reentered correctly, and reinputs right data.

[0041] At the above-mentioned step S7, when all the data of a scorecard are read, "1" increment of (S7, Y), and the player counter is carried out (step S10), the value of the player counter after this increment is compared with the number of players stored in the system RAM 14, and it distinguishes whether counting by the player counter is counting up (step S11).

[0042] And if it is not counting up (S11, N), it repeats until reading of the scorecard of all players ends returning to the above-mentioned step S4 and processing step S4-S11 again.

[0043] When reading termination of the scorecard of all players is checked at the above-mentioned step S11, (S11, Y), The score data of all the read scorecards are totaled. for every player The operation which

computes a gross by totaling out and Inn's score, and computes a network by deducting a handicap from this computed gross is performed. A player name, the sum total score of out, Inn's sum total score, a gross, a handicap, and the results data that consist of a network are created (step S12).

[0044] Then, based on the network value for every player which carried out [above-mentioned] calculation, results data are sorted in ascending order, and the player data located in a line in order of ranking are created (step S13). Next, from the soft curd 8 inserted in the slot 2-1 for cards, form data are read, the scorecard form data (image data) which consist of line counts corresponding to the number of players are generated based on this read form data and the number of players (this example "20") stored in the system RAM 14, and this image data is developed to FRAM16 (step S14).

[0045] Furthermore, alphabetic data, such as a full name and a score, is generated based on the results data (player data) which carried out [above-mentioned] creation, and sequential expansion of the these-generated alphabetic data (image data) is carried out at the notation column (address) to which the image data of the scorecard form developed by FRAM16 corresponds (step S15).

[0046] And expansion of all data is completed, and the printout of the image data developed to this FRAM16 is transmitted and carried out to printer engine 18 through printer I/F17 (step S16). In this processing, a printout is copied and carried out to the fixed form form of the proper size of the number of sheets for a total of player several minutes.

[0047] Thereby, game results, such as each ranking, can be known by an organizer not posting to a large-sized form form by "OOO Golf competition scorecard" which the player was distributed at hand each one, for example, is shown in drawing 7 , and the scorecard to which the title was attached, and it can leave each one of hands by considering the scorecard as commemoration.

[0048] Moreover, like the first example of the above, a printout may not be copied and carried out to a fixed form form, but a printout may be carried out to one sheet of the same large-sized form form as the case where it writes by hand, by a plotter etc. so that it can ****** for the hall like before.

[0049] It explains below by making this into the second example. Drawing 8 is the block diagram showing the hardware configuration of the control section as the second example prepared in the interior of the printer 1 shown in drawing 1 . Printer control-section 10' shown in this drawing

gives and shows the same sign about the same component as the printer
control section 10 shown in drawing 2 . The plotter data converter 21 is
newly connected to a bus line 11, and, as for printer control-section
10' shown in drawing 8 , plotter I/F22 is connected to the plotter data
converter 21. The plotter 25 as shown in drawing 9 is connected to this
plotter I/F22 by the interconnection cable 26 free [attachment and
detachment].
[0050] In this 2nd example, CPU12 shown in drawing 8 controls the
plotter data converter 21, transforms the pattern data developed to
FRAM16 to the printing data which are adapted for a plotter 25, and
outputs this to a plotter 25 through plotter I/F22.
[0051] In the second example of such a configuration, it explains using
the flow chart which shows the processing actuation which reads the mark
sheet mentioned above and carries out a printout in predetermined form
to drawing 10 . In addition, this processing is the same as processing
actuation of the first example shown in drawing 6 almost, and the same
step number is given and shown in the same processing actuation.
Moreover, this processing is started by CPU12 of control-section 10'
shown in drawing 8 by calling an optional menu to the actuation display
3, and carrying out the assignment input of the plotter printing, after
a user equips a printer 1 with the soft curd 8 for golf competitions and
connects a plotter 25 to plotter I/F22.
[0052] First, it processes like the case of drawing 6 to steps S1-S15.
And the pattern data developed to FRAM16 are transmitted to the plotter
data converter 21 after the above-mentioned step S15 (step S21), the
purport which starts plotter printing from this to the actuation display
3 is displayed (step S22), and the key input from the user who checks
this is stood by (step S23).
[0053] When connection of a plotter 25, the set of a form form, etc. are
checked by the user and it checks that alter operation of a check or the
Enter key had been carried out from the actuation display 3, data are
transmitted to a plotter 25 through plotter I/F22 from (S23, Y), and the
plotter data converter 21, and a printout is started (step S24). Thereby,
"OOO Golf competition scorecard" shown in drawing 7 and the scorecard to
which the title was given are printed by the large-sized form form.
[0054] In addition, in the example mentioned above, although each is
printing the data of a player in order of ranking to the scorecard, it
may be made to carry out a sequential notation for every party at the
order of game initiation like the case of handwriting.
[0055] Moreover, although he is trying to make one scorecard read for
every player, if the automatic recognition of the player name can be

been made to carry out in the serial number etc. and four partners'
results are read in one scorecard at a time for every party, the large
competition, for example exceeding 100 persons can also perform from a
data input to printing of a scorecard still more quickly.
[0056] Moreover, although the application program is read from a system
RAM 14 and processing is performed in the above-mentioned example once
it loads the application program of soft curd 8 to the application
program field of a system RAM 14, it may be made to perform processing,
carrying out direct access of the AP-ROM8a of soft curd 8, without
restricting to this.
[0057] Moreover, although the example which reads the mark entered in
the scorecard of golf and carries out a data total was explained, this
invention is not limited to reading of the scorecard of golf, if the
application software which reads the mark sheet with which data, such as
other data, for example, the clinical recording of a hospital, a
questionnaire, and national census, were written in soft curd (memory
card) 8, and totals is contained, it can use for the total of any data
and various application will be considered.
[0058]
[Effect of the Invention] Since all activities until it carries out the
printout of the total result to a form form from a data input can do
automatically by easy actuation only by inserting in a printer the soft
curd constituted by the printer body free [attachment and detachment]
according to this invention, not using a host device as explained to the
detail above, the cheap printing system which became unnecessary [the
large-sized system which combined the highly efficient and expensive
host device], therefore printing cost and power consumption reduced is
realizable. Moreover, only by exchanging the soft curd equipped with
what kind of total, and making the mark of an adapted mark sheet read,
since from the total of data to printing is performed automatically, it
can work easily and quickly by becoming skilled neither about actuation
of a device nor the operation of software.

[Translation done.]

2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the perspective view showing the appearance
configuration of the printer of the first example.
[Drawing 2] It is the block diagram showing the whole control-section
configuration of the printer of the first example.
[Drawing 3] It is drawing (the 1) explaining a mark sheet.
[Drawing 4] It is drawing (the 2) explaining a mark sheet.
[Drawing 5] It is drawing (the 3) explaining a mark sheet.
[Drawing 6] It is a flow chart explaining the processing actuation based
on the application program in the soft curd by CPU of the first example.
[Drawing 7] It is drawing showing an example of printing form.
[Drawing 8] It is the block diagram showing the whole control-section
configuration of the printer of the second example.
[Drawing 9] It is drawing showing the plotter connected to the printer
of the second example.
[Drawing 10] It is a flow chart explaining the processing actuation
based on the application program in the soft curd by CPU of the second
example.
[Description of Notations]
1 Printer
2-1, 2-2 Slot for cards
3 Actuation Display
4 Mark Sheet Reader
4a Guide plate
4b Tray
4c Mark sheet reader controller
4d Reader
5 Form Cassette Insertion Opening
6 Delivery Roller
7 Paper Output Tray Section
8 Soft Curd (Memory Card)
10 10' Printer control section
11 Bus Line
12 CPU(Central-Processing-Unit)
13 System ROM (ROM:Read-Only-Memory)

14 System RAM (RAM:Random-Access-Memory)
16 FRAM
17 Printer I/F (I/F: Interface)
18 Printer Engine
21 Plotter Data Converter
22 Plotter I/F
25 Plotter
26 Interconnection Cable

[Translation done.]

* NOTICES *

DRAWINGS

[Drawing 1]

[Drawing 2]

ホスト機器 ～20

ホスト I/F ～19

10(1)

アプリケーション
ソフトカード ～8
APROM
8a

14～ システム
RAM

2-1～
(2-2)

13～ システム
ROM

12～ CPU

FRAM ～16

～11

操作表示部

4c
マークシート
リーダ
コントローラ

3

プリンタ I/F ～17

プリンタ
エンジン ～18

リーダ ～4d

[Drawing 3]

PLAYER NAME

31

ABCDEFGHIJKLMNOPQRSTUVWXYZ 00000000000000●00000000000	ABCDEFGHIJKLMNOPQRSTUVWXYZ 00000000000000000●00000000	ABCDEFGHIJKLMNOPQRSTUVWXYZ 0●000000000000000000000000	～31-1
ABCDEFGHIJKLMNOPQRSTUVWXYZ 0000000000●0000000000000000	ABCDEFGHIJKLMNOPQRSTUVWXYZ 00000000●00000000000000000	ABCDEFGHIJKLMNOPQRSTUVWXYZ 00000000000●000000000000000	～31-2
ABCDEFGHIJKLMNOPQRSTUVWXYZ ●000000000000000000000000	ABCDEFGHIJKLMNOPQRSTUVWXYZ 00000000000000000●00000000	ABCDEFGHIJKLMNOPQRSTUVWXYZ ●000000000000000000000000	～31-3
ABCDEFGHIJKLMNOPQRSTUVWXYZ 000000000000000000●00000000	ABCDEFGHIJKLMNOPQRSTUVWXYZ 000000000000000000●00000000	ABCDEFGHIJKLMNOPQRSTUVWXYZ 00000000000000000000000000	～31-4

[Drawing 4]

OUT

32-1 32 32-2   32-3   32-4

NO	HCP	YARDAGE		PAR	尾崎	中村	村上	中島	
		BACK T E E	FRONT T E E						
					0 1 0 0 0123456789 0000●0000	0 1 0 0 0123456789 0000●0000	0 1 0 0 0123456789 0000●0000	0 1 0 0 0123456789 0000●000	32-5-1
1	2	495	465	5					32-5-2
2	16	340	315	4	0 1 0 0 0123456789 00000●0000	0 1 0 0 0123456789 00000●0000	0 1 0 0 0123456789 00000●0000	0 1 0 0 0123456789 00000●0000	

[Drawing 5]

32-1   3,3

IN

18	8	370	335	4	0 1 0 0 0123456789 0000000000	0 1 0 0 0123456789 0000000000	0 1 0 0 0123456789 0000000000	0 1 0 0 0123456789 0000000000	
OUT		3050	2810	36	0123456789 0000000000 0123456789 0000000000	0123456789 0000000000 0123456789 0000000000	0123456789 0000000000 0123456789 0000000000	0123456789 0000000000 0123456789 0000000000	33-1
IN		3120	2880	36	0123456789 0000000000 0123456789 0000000000	0123456789 0000000000 0123456789 0000000000	0123456789 0000000000 0123456789 0000000000	0123456789 0000000000 0123456789 0000000000	33-2
TOTAL		6170	5690	72	0 1 0 0 0123456789 0000000000 0123456789 0000000000	0 1 0 0 0123456789 0000000000 0123456789 0000000000	0 1 0 0 0123456789 0000000000 0123456789 0000000000	0 1 0 0 0123456789 0000000000 0123456789 0000000000	33-3
HANDICAP					01234 00000 0123456789 0000000000	01234 00000 0123456789 0000000000	01234 00000 0123456789 0000000000	01234 00000 0123456789 0000000000	33-4
NET SCORE					0 1 0 0 0123456789 0000000000 0123456789 0000000000	0 1 0 0 0123456789 0000000000 0123456789 0000000000	0 1 0 0 0123456789 0000000000 0123456789 0000000000	0 1 0 0 0123456789 0000000000 0123456789 0000000000	33-5

[Drawing 6]

```
              ● START                                   ● ┌──────────────┐
                                                          │ 全カードデータ集計 │ S12
              ┌──────────────┐ S1                         │ 演算処理成績   │
              │ プレーヤ人数   │                           │ データ作成     │
              │ の入力表示     │                           └──────────────┘
              └──────────────┘                                  │
                     │                                    ┌──────────────┐ S13
      N      ╱─────────────╲ S2                           │ 順位順にデータ  │
      ┌─────〈   入 力 ？   〉                             │ ソート        │
      │      ╲─────────────╱                              └──────────────┘
      │             │ Y                                         │
      │      ┌──────────────┐ S3                        ┌──────────────┐ S14
      │      │ プレーヤ数ストア │                          │ プレーヤ数に対応し │
      │      └──────────────┘                            │ た成績表フォーム  │
      │             │                                    │ データを発生しフレ │
      │   S4 ┌──────────────┐                            │ ームメモリへ展開  │
      │      │ スコアカード    │                           └──────────────┘
      │      │ 挿入表示       │                                  │
      │      └──────────────┘                            ┌──────────────┐ S15
      │             │                                    │ 成績データに基づく │
      │   S5 ╱─────────────╲        N                    │ 文字パターンを発生 │
      │  ┌──〈  カード挿入    〉─────┐                     │ しフレームメモリへ │
      │  │   ╲     ？      ╱       │                     │ 展開          │
      │  │    ╲─────────────╱       │                     └──────────────┘
      │  │          │ Y            │                            │
      │  │   S6 ┌──────────────┐   │                     ┌──────────────┐ S16
      │  │      │ マークリード    │   │                     │ フレームメモリデー │
      │  │      │(プレーヤ NAME)│   │                     │ タを印字出力     │
      │  │      │ HDCP        │   │                     └──────────────┘
      │  │      │(各ホールスコア )│   │                            │
      │  │      └──────────────┘   │                          ● END
      │  │           │             │
      │  │   S8   N ╱──────╲ S7    │
      │  │ ┌──────┬─〈 カード   〉   │
      │  │ │記入漏れ│  〈の全データリード〉
      │  │ │警告表示│  ╲    ？   ╱   │
      │  │ └──────┘   ╲──────╱    │
      │  │     │         │ Y  S10  │
      │  │ ┌──────┐ ┌──────────┐  │
      │  │ │リードデー│ │プレーヤカウンタ│  │
      │  │ │タクリア  │ │  ＋1     │  │
      │  │ └──────┘ └──────────┘  │
      │  │    S9        │          │
      │  │           ╱──────╲   N  │
      │  └──────────〈 プレーヤ  〉───┘
      │              〈カウンタUP 〉
      │          S11  ╲   ？   ╱
      │               ╲──────╱
      │                  │ Y
      └──────────────────┘
```
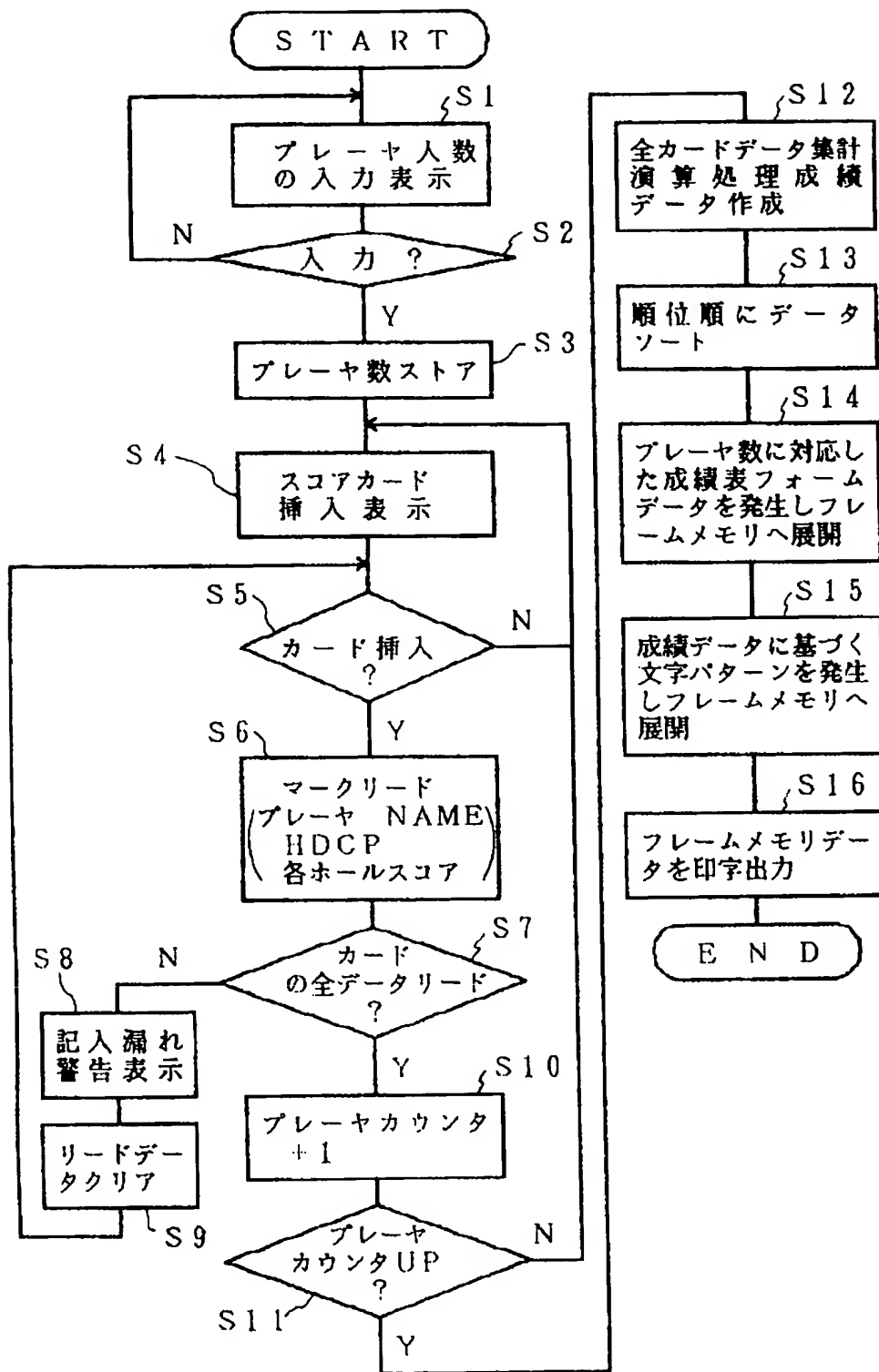
[Drawing 7]

○○○ゴルフコンペ成績表

平成○年○月○日   △△カントリークラブ

順 位	PLAYER	OUT	IN	GROSS	HDCP	NET
優 勝	尾崎 将	4 3	4 1	8 4	1 2	7 2
準優勝	中村 通雄	4 2	4 0	8 2	9	7 3
3位	尾崎 直人	4 5	4 5	9 0	1 5	7 5
4位	林 恒夫	4 8	5 0	9 8	2 2	7 6
5位	山田 太郎	4 5	5 0	9 5	1 8	7 7
6位	村上 充吉	4 9	4 7	9 6	1 7	7 9
7位	田辺 康男	4 4	5 9	1 0 3	2 2	8 1
8位	中島 浩司	4 6	5 1	9 7	1 6	8 1
9位	富田 茂	4 7	4 8	9 5	1 2	8 3
1 0位	吉田 徳造	4 9	5 4	1 0 3	1 9	8 4
1 1位	住友 憲司	5 1	4 8	9 9	1 3	8 6
1 2位	平松 丈夫	5 4	5 8	1 1 2	2 5	8 7
1 3位	正田 進	5 7	5 6	1 1 3	2 4	8 9
1 4位	鈴木 陸夫	5 5	6 3	1 1 8	2 8	9 0
1 5位	富塚 達次	5 7	5 4	1 1 1	1 9	9 2
1 6位	木村 幹夫	6 1	6 5	1 2 6	3 2	9 4
1 7位	工藤 則夫	5 9	6 7	1 2 6	2 8	9 8
1 8位	島崎 郁夫	6 7	6 1	1 2 8	2 9	9 9
B. B	東郷 広孝	6 0	7 3	1 3 3	3 3	1 0 0
B. M	佐藤 公男	6 6	6 6	1 3 2	3 0	1 0 2

93-0693   図7   7/10

[Drawing 8]

[Drawing 9]

[Drawing 10]

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                         ┌─────────────┐
                    ┌───▶│   START     │
                    │    └──────┬──────┘
                    │           │ S1
                    │    ┌──────────────┐              ┌──────────────────┐
                    │    │ プレーヤ人数  │              │ 全カードデータ集計 │ S12
                    │    │ の入力表示    │              │ 演算処理成績      │
                    │    └──────┬──────┘              │ データ作成        │
                    │  N        │ S2                  └─────────┬────────┘
                    └───◇─────────────◇                        │ S13
                         ◇  入力 ?    ◇              ┌──────────────────┐
                         ◇           ◇              │ 位順にデータソート │
                              │ Y                    └─────────┬────────┘
                    ┌──────────────┐ S3                        │ S14
                    │ プレーヤ数ストア │             ┌──────────────────┐
                    └──────┬──────┘              │ プレーヤ数に対応し │
                           │  ◀──────────┐       │ た成績表フォーム   │
              S4    ┌──────────────┐     │       │ データを発生しフレ │
                    │ スコアカード   │     │       │ ームメモリへ展開   │
                    │ 挿入表示      │     │       └─────────┬────────┘
                    └──────┬──────┘     │                 │ S15
                           │  ◀─────────┐│       ┌──────────────────┐
              S5           │            ││       │ 成績データに基づく │
                    ◇─────────────◇  N ││       │ 文字パターンを発生 │
                    ◇ カード挿入    ◇────┘│       │ しフレームメモリへ │
                    ◇    ?        ◇     │       │ 展開              │
                         │ Y            │       └─────────┬────────┘
              S6  ┌──────────────┐      │                 │ S21
                  │  マークリード  │      │       ┌──────────────────┐
                  │ (プレーヤ NAME)│      │       │ フレームメモリデー │
                  │  HDCP        │      │       │ タを印字出力      │
                  │ 各ホールスコア │       │       └─────────┬────────┘
                  └──────┬──────┘       │                 │ S22
        S8   N          │ S7           │       ┌──────────────────┐
    ┌──────◇─────────────◇             │       │ プロッタ印刷      │
    │      ◇ カード       ◇             │       │ 確認表示          │
    │      ◇ の全データリード◇           │       └─────────┬────────┘
 ┌──────────┐  ◇    ?     ◇            │                 │ S23
 │ 記入漏れ  │       │ Y   S10          │         ◇─────────────◇  N
 │ 警告表示  │  ┌──────────────┐        │         ◇ yes入力     ◇────┐
 └────┬─────┘  │ プレーヤカウンタ│        │         ◇    ?       ◇    │
      │        │  +1         │        │              │ Y  S24   │
 ┌──────────┐  └──────┬──────┘        │       ┌──────────────────┐ │
 │ リードデー│         │               │       │ データをプロッタ  │ │
 │ タクリア  │         │               │       │ へ転送           │ │
 └────┬─────┘ S9      │               │       └─────────┬────────┘ │
      │    ◇─────────────◇  N          │                 │  ◀───────┘
      └───◇ プレーヤ      ◇─────────────┘       ┌──────────────┐
          ◇ カウンタUP    ◇                     │   END        │
     S11  ◇    ?         ◇                      └──────────────┘
               │ Y
               └─────────────────┘
```
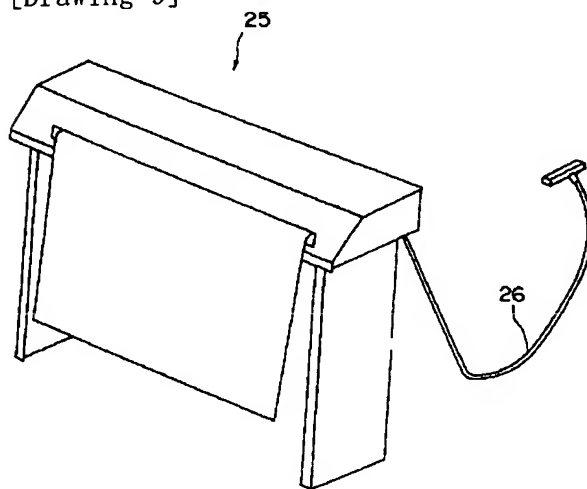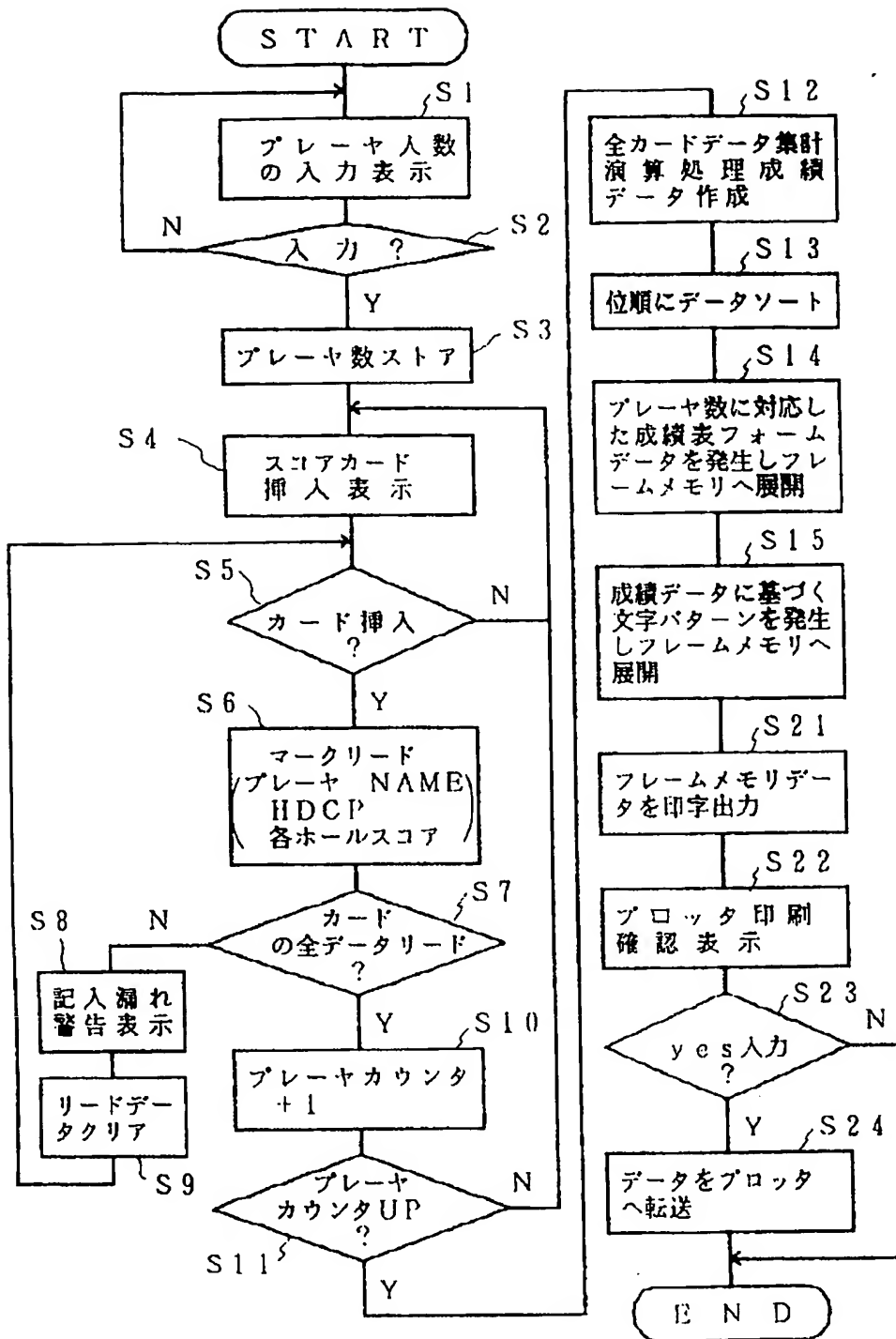
[Translation done.]